

Choose wisely a watermaker



One cruiser's research points to the benefits of a 110-volt system

by **Sam Mazza**

So you are in the market for a watermaker. You are willing, finally, to plop down a few grand so that you won't have to do a rain dance every time you want to take a shower. If your battery-recharging regiment includes using a diesel generator, this article may be for you.

You are ready to make a big decision so you are doing full-

scale market research. You have discovered that there are many choices. Maybe even more than you care to study. You have checked the specifications of various models from a few manufacturers on the web, read articles in magazines, talked to other cruisers, gone to a boat show to speak to a manufacturer's representatives, collected brochures, what the heck,

you may even have a spreadsheet with all of the information that you have gathered. But, in the end, how do you actually choose? Wisely, that is. Which of the many criteria are deal makers and which are deal breakers? Look at all of the parameters you have to evaluate (in no particular order): cost (initial plus consumables), reliability, guarantee, amp draw, output per hour, out-

put per amp, cost of operation per gallon, available space for installation, noise, ease of use, ease of maintenance, availability of spare parts around the world.

Certainly, you don't need my help in figuring out which watermaker you can afford and which you can't. Most technical information that you can use to compare watermakers is readily available. In spite of all the information, a clear winner might not be so obvious. Well, this is where I can help a bit to narrow the choices. But don't expect the end of this article to name a brand and model. There simply is no one-size-fits-all magic formula when it comes to selecting a watermaker.

There is at least one criterion I left out intentionally from the list above. Can you spot the missing one? While you are thinking about it, I want to touch on some criteria from the list above.

CAMPING OUT IN STYLE

Apart from the specifications, what else is important in selecting a watermaker? When I left the U.S. on my sailboat a fellow cruiser told me that cruising is like camping on the water. Well in a sense it is, but only to the extent that you make it so. Being a cruiser already requires quite a few lifestyle compromises and sacrifices. So why add more? Why can't we cruisers camp out in style? After all it is our lives we are talking about. Personally, I did not want to give up on my shower regiment. Back home I would shower at least twice a day. And since I started cruising I learned to take two showers a day without going water-broke. And I can still afford a quick freshwater rinse after a dip in the big blue. In all, I might consume about eight gallons per day (GPD). With a

medium-size watermaker, we are talking about one hour of operation and probably no more than 20 amps. If you are cruising as a couple, you can probably live comfortably on about 15 GPD. A crew of four might need 30 GPD, maybe a bit less with some extra discipline.

Why is all of this important, and how does it affect your usage of the watermaker? You need to establish a base for how much water and amps you will need to generate for each live-aboard day. Then you will have to figure out how to get back what you have spent. I choose to run my watermaker every day to replenish yesterday's consumption. It is part of my daily routine: take two showers, brush my teeth after every meal and refill the water tanks. My reasoning is that when something unexpected happens that might disable the watermaker, I will have only one day's worth of water deficit. Then I can start making additional sacrifices and

conserve water like I am camping in the Mojave desert. If I had run the watermaker say once a week, I would be out 56 gallons. That is a tad over half of my 100-gallon total capacity. And that would not be a position to envy. I can then figure out what capacity watermaker I need. If I am OK with running the watermaker two hours per day, then a four-gallon-per-hour (GPH) watermaker would do just fine. But if my patience is just for one hour of water making, then an eight-GPH system would do better. But as a general rule, I would never buy a system that would have to run at its full capacity to satisfy my needs. So if I had to choose a new watermaker for my boat I would be looking to get at least a 10- to 12-GPH-producing system. The extra capacity acts as a safety buffer.

Hopefully, I have convinced you that running your watermaker daily is a good idea. Now you can figure out your daily water-making



The author, opposite, charges his batteries with a Westerbeke generator, above

amp cost. It follows that you must have some way of recouping those precious amps. Depending on your electric system, you could be doing so using solar panels, wind and/or a diesel generator. If you have sufficient wind and solar generation capacity, you will have no further problems. Let the watermaker make water. Let nature recharge your batteries. But if you are planning to recharge your batteries with a generator, I want to you pay close attention, just about now—this is where “wisely” comes into play.

RECHARGING ROUTINE

The criterion I had omitted earlier in the article was your recharging routine. Suddenly wisely choosing a watermaker involves an understanding of your electrical recharging system. Let us review some battery charging basics.

1) For every amp that you draw from your batteries, your generator will have to produce about 1.2 recharging amps. That is so because there is a loss in the recharging process. The actual extra amount depends on the health and state of your batteries,

but a 20-percent margin is a reasonable assumption.

2) The type, health and state of your batteries will also determine how many amps can be absorbed per unit of time. The fuller the batteries, the fewer amps they can absorb. During a normal charging cycle, fewer and fewer amps are absorbed by the batteries. With my Westerbeke 7.6-kilowatt generator, I can push 80 amps at the beginning of the charging cycle. But that declines until it no longer becomes efficient to run the generator because so few of the amps produced are absorbed by the batteries. At that point I am just burning fuel. Typically, I shut the generator when the batteries are absorbing no more than 10 to 15 percent of their capacity.

It follows that during a full charging cycle your generator will be able to output more amps than your batteries can absorb. You might want to read that sentence again; it is the key to this article.

Let us look at an example, say you consumed 20 amps and your generator is putting out 60 amps and your batteries are able to accept 60 amps per hour. It would

take 24 minutes (20 plus 20 percent of 20) to recover those 20 amps. How does this scenario look if the batteries can only absorb 40 of the 60 amps per hour that the generator makes? Twenty-four amps is a bit more than half of the 40 amps that can be absorbed. So you will have to run the generator for more than half an hour to recover the 24 amps. Furthermore, the spare 20 amps that the generator is putting out are, well, lost.

LESS WASTE

The beauty is that there is something you can do to avoid some of that loss. That is when a 110-volt, rather than a 12-volt, watermaker comes to the rescue. With a 110-volt watermaker, your daily routine draws 20 amps less from the batteries. And when you run the generator to recharge the batteries you will be using what would have been your daily wasted generator output to make water. Got it? In other words, you are going to be running the generator anyway. Your generator outputs more amps than can be absorbed by the batteries. These amps can be used by

Yanti Parazi's Spectra 380C watermaker



The system utilizes two 12-volt Shurflo feed pumps





The control panels of the watermaker, above, and the Westerbeke generator, right



the 110-volt watermaker. Certainly this argument doesn't apply only to watermakers.

Maybe you are not yet convinced. Let me ask you one last question: What do watermakers and generators have in common? Answer: They both make noise. I, as part of my daily routine, run my 12-volt watermaker at the same time that I run my generator. I might as well make all of the not-so-pleasant noise I need to make in the space of as little time as possible. I would rather hear the waves and the wind than the hum and buzz of the generator and water pumps. Basically, I am, by choice, already running both systems at the same time, even though I have a 12-volt watermaker. With a 110-volt watermaker, I wouldn't have to worry about charging inefficiencies, and there would be one fewer system taxing my batteries.

Finally, I think it would be a safe guess to say that you would run neither the generator nor the watermaker unattended. So if you do not run them simultaneously, you would be confining yourself to your boat for the duration of running both systems successively. You could be sitting at a seaside

bar having a cold one instead.

On *Yanti Parazi* I have a Spectra 380C watermaker. It is a 12-volt setup with two Shurflo feed pumps, with about 15 GPH capacity. These pumps are the weak link in an otherwise great system. Eventually I gave up on repairing and replacing these pumps and started to look for alternatives. That is when I realized that I would be better off with a 110-volt pump. I am now searching for a suitable alternative. It turns out that there isn't a perfect pump that would fit the 380C system specifications. But that should not hold you back from buying a 110-volt system from the get-go. It is easier to buy a 110-volt system than to upgrade one.

Any which way I look at it, it makes more sense to have a 110-volt watermaker than a 12-volt one. Until I find a replacement pump, I will compromise and live with what came with the boat. But you have the advantage of learning from other's not-so-wise decisions. Whatever watermaker system you decide on, make sure it will meet your needs. And remember that you can't go wrong if you never say never and always choose wisely. 